International Journal of Green Pharmacy 2018 vol.12 N3, pages S716-S721

# Study of ceramics color development on the basis of Nizhneuvelsky kaolin clay

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## Abstract

© 2018 BRNSS Publication Hub. All rights reserved. Aim: They analyzed the influence of iron-containing phases on the ceramics color development made of Kaolin clay of Nizhneuvelsky deposit. Materials and Methods: The result of the complex application of modern study methods - thermal, electron microscopic, radiographic, Mossbauer, optical - it was established that the change of kaolin clay calcination temperature from 1000°C to 1200°C leads to the increase of L* luminance from 75 to 79 NBS units (National Bureau of Standards, USA), which correlates with the analysis of Mössbauer spectra, reflecting the decrease of the strongly staining phase of hematite. The crystallization of the mullite mineral is the consequence of ceramics clarification process based on Kaolin clay with the calcination temperature increase from 1000°C to 1200°C. Results: It was found that the absorption bands in the calcined clay of the Nizhneuvelsk deposit with the wavelengths of 432 and 480 nm, baked at 1000°C, are associated with spin-forbidden transitions 6A1 (6S) →4A14E (4G) in Fe3+ ions that have an octahedral environment. Conclusion: It was found that Fe3+ ions could produce the absorption lines at the wavelengths of 432 and 480 nm, only being in the structure of mullite. At 1200°C, the partial amorphization of the mineral composition of clay takes place, which leads to the averaging and broadening of the absorption band in the area of 400–550 nm.

## Keywords

Ceramics color, Hematite, Kaolin clay, Kaolinite, Mossbauer spectrum, Mullite, Optical spectrum

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